

WHAT IS CLAIMED IS:

1. A method for the preparing a cathode active material comprising:

a mixing step of mixing starting materials for synthesis of a compound represented by a general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, where M is at least one selected from a group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with $0.05 \leq x \leq 1.2$ and $0 \leq y \leq 0.8$;

a milling step of milling a mixture obtained in said mixing step;

a compressing step of compressing the mixture milled in said milling step to a preset density; and

a sintering step of sintering the mixture compressed in said compressing step, wherein a carbon material is added in any of the above steps previous to said sintering step, and wherein the preset density of said mixture in said compressing step is not less than 1.71 g/cm^3 and not larger than 2.45 g/cm^3 .

2. A method for preparing a non-aqueous electrolyte cell having a cathode including a cathode active material, an anode including an anode active material and a non-aqueous electrolyte, wherein said cathode active material is produced by a mixing step of mixing starting materials for synthesis of a compound represented by a general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, where M is at least one selected from a group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with $0.05 \leq x \leq 1.2$ and $0 \leq y \leq 0.8$, a milling step of milling a mixture obtained in said mixing step, a compressing step of compressing the mixture milled in the milling step to a preset

density, and a sintering step of sintering the mixture compressed in said compressing step,

wherein a carbon material is added in any of the above steps previous to said sintering step and wherein the preset density of said mixture in said compressing step is not less than 1.71 g/cm^3 and not larger than 2.45 g/cm^3 .

3. The method for preparing the non-aqueous electrolyte cell according to claim 2 wherein a non-aqueous electrolyte is used as a solution of an electrolyte in a non-protonic non-aqueous solvent.

4. The method for preparing the non-aqueous electrolyte cell according to claim 2 wherein a polymer electrolyte is used as a solid electrolyte.

5. A method for preparing a cathode active material comprising:

a mixing step of mixing starting materials for synthesis of a compound represented by a general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, where M is at least one selected from a group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with $0.05 \leq x \leq 1.2$ and $0 \leq y \leq 0.8$;

a milling step of milling a mixture obtained in said mixing step; and

a sintering step of sintering the mixture milled in said milling step,

wherein a carbon material is added in any of the above steps, and wherein, after said milling step, a tap density of the starting materials for synthesis is not less than 0.4 g/cc and not larger than 2.0 g/cc .

6. The method for preparing a cathode active material according to claim 5 wherein

as the compound represented by the general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, a compound represented by the general formula Li_xFePO_4 , where $0 < x \leq 1$, is synthesized.

7. A method for preparing a non-aqueous electrolyte cell having a cathode including a cathode active material, an anode including an anode active material and a non-aqueous electrolyte wherein said cathode active material is produced by a mixing step of mixing starting materials for synthesis of a compound represented by a general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, where M is at least one selected from a group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with $0.05 \leq x \leq 1.2$, $0 \leq y \leq 0.8$, a milling step of milling a mixture obtained in said mixing step, and a sintering step of sintering the mixture milled in said milling step,

wherein a carbon material is added in any of the above steps, and wherein, after said milling step, a tap density of the starting materials for synthesis is not less than 0.4 g/cc and not larger than 2.0 g/cc.

8. The method for preparing the non-aqueous electrolyte cell according to claim 7 wherein as the compound represented by the general formula $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$, a compound represented by a general formula Li_xFePO_4 , where $0 < x \leq 1$, is synthesized.

9. The method for preparing the non-aqueous electrolyte cell according to claim 7 wherein a non-aqueous electrolyte is used as a solution of an electrolyte in a non-protonic non-aqueous solvent.

10. The method for the preparing the non-aqueous electrolyte cell according to claim 7 wherein a polymer electrolyte is used as a solid electrolyte.